



Roles of *AEE* and *JEE* for the Engineering Education Community

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INTRODUCTION AND OVERVIEW OF *AEE* AND *JEE*

While there are multiple journals in the field of engineering education, two are in similar but distinct publishing spaces: *Advances in Engineering Education (AEE)* and the *Journal of Engineering Education (JEE)*. Both are associated with the American Society for Engineering Education (ASEE) and publish scholarship related to engineering education. What distinguishes the two?

The guiding mission of *AEE* is to cultivate, disseminate, and archive documented **innovations, applications, and practices** in engineering education, meaning it publishes implemented research that pushes the boundaries of new practices in engineering education, both inside and outside of the classroom. These works are grounded in literature and theory, apply robust instructional design methodologies, and are backed by thorough and appropriate assessments and evaluations. Most importantly, *AEE* authors must clearly articulate what makes the innovation novel. For example, problem-based learning (PBL) activities are not inherently novel, but there may be elements of applications that merit publication, for example, the way a specific application of PBL is assessed. *AEE* embraces the research-to-practice cycle, focusing on research-informed practice in engineering education (Jamieson and Lohman, 2009). Thus, the scholarly advancements promoted in its publications draw on prior work that uses theories and frameworks to ground and propagate implementable innovations. Such innovations do not need to be directly classroom related; for example, professional development workshops for instructors would be appropriate for publication in *AEE*. Types of manuscripts published in this journal include unsolicited articles that document advances in the field (full manuscript), opinion pieces that offer a well-grounded view on a topic or issue, and looking-ahead articles that describe early stages of innovation implementation that, like full manuscripts, are grounded in theory and include some form of evaluation. Occasionally, special issues are curated to focus on specific topics.

The guiding mission of *JEE* is to cultivate, disseminate, and archive **scholarly research** in engineering education. Similar to *AEE*, work published in *JEE* is grounded in extant literature



and theory, applies robust research designs and methodologies and advances the body of knowledge in engineering education. While *JEE* manuscript topics typically fall within five broad research areas (engineering epistemologies, engineering learning mechanisms, engineering learning systems, engineering diversity and inclusiveness, and engineering assessment), it also welcomes emerging research areas in engineering education. Types of manuscripts published in *JEE* include research articles, research reviews, and guest editorials; however, other types may be considered upon editor approval. For research articles, which can include empirical research as well as theoretical and conceptual work, a broad range of quantitative, qualitative, and mixed methods research designs are acceptable. Review articles comprise various formats, such as systematic reviews, scoping reviews, and meta-analyses, that synthesize and evaluate existing literature to advance engineering education research and practice. Manuscripts that primarily describe a curricular or pedagogical innovation are generally not appropriate for publication although these innovative approaches can serve as contexts for the research. For example, a course or curriculum that uses PBL can provide a rich and appropriate environment for conducting research on students' approaches to problem solving or metacognition. Such research could include, for example, instrument development, model building, or theory building. Curated special issues and virtual issues on specific themes are occasionally published. For example, there is a recent call for papers on systematic reviews and meta-analyses, and an upcoming special themed section on the effects of the COVID-19 pandemic on engineering education that will be appearing in this year's volume of *JEE*.

Applied research is often where *AEE* and *JEE* are perceived as overlapping. *AEE* manuscripts comprise a form of applied research specifically related to educational innovations. For *JEE*, applied research should be grounded in prior research and theory, apply robust educational research methods for data collection and analysis, and synthesize results with appropriate frameworks. Similar to *JEE*, work published in *AEE* should also be framed in current literature and educational theory; relevant data should be collected and analyzed, and the findings should be discussed and interpreted in terms of what worked and what in the innovation might need improvement. In *JEE*, the focus is on the research more than the application itself, with the findings advancing knowledge and applications pointing to their transformative potential. In contrast, the application is the focus of work published in *AEE*, with the design and development of the innovation being prominent and supported by literature. Thus, there are similarities in works published in *AEE* and *JEE* such as solid grounding in literature, systematic data collection, and meaningful interpretation of the data; however, they differ in focus: *JEE* focuses on research and *AEE* on the evaluation of innovation implementation. To further clarify, we contrast the two journals in terms of research and evaluation, the use of frameworks, and the role of theory.



RESEARCH VERSUS EVALUATION

Several sources offer distinctions between educational research and evaluation while acknowledging that the two are not dichotomous and often share frameworks, methods and approaches. Patton (2014) created a series of evaluation flashcards which offer the following distinction between the two: “Evaluation generates improvements, judgments, and actionable learning about programs. Research generates knowledge about how the world works and why it works as it does” (p.7). *The Sage Encyclopedia of Educational Research, Measurement, and Evaluation* offers a similar distinction:

The fundamental difference between evaluation and research lies in the purpose and motivation behind the work. The goal behind research is to contribute to a body of knowledge and theory in a field. An intellectual question and the opportunity to contribute to a broader understanding of a subject or body of study often motivates researchers. In contrast, the focus of evaluation, as a form of applied research, is to judge merit or quality as determined by the interests of various stakeholders, such as funding agencies. As a result, evaluators often view the work that is being conducted with a different lens and a broader perspective than that of researchers. (Frey, 2018, pp. 629–630)

Further, this source offers an example grounded in engineering that demonstrates the differences between research and evaluation.

Based on these definitions and the focus of the two journals, the following questions might help authors decide the appropriate journal for their articles:

- Is the focus of the work primarily on evaluating an educational innovation rather than advancing knowledge of the research methods, framework, etc.? (For example, does the text in the methods focus on describing the intervention versus describing research methods?) If yes, *AEE* would be the better fit.
- Are the investigative questions yes/no questions? (For example, “Does this intervention enhance student knowledge on this topic?”) If yes, *AEE* would be the better fit.
- Are there research questions or evaluation questions? (For example, is the study researching a broad aspect of student experiences in an innovative educational context or is it evaluating the educational innovation?) If research questions, *JEE* would be the better fit. If evaluation questions, *AEE* would be the better fit.
- Are the methods solidly grounded in educational research methods? (For example, a methodological approach is described and serves as an exemplar for the data collection and analysis approaches.) If yes, *JEE* would be the better fit.



- Does the study focus on generalizable or transferable knowledge versus knowledge about a specific educational innovation? If the former, *JEE* would be a better fit while the latter is more suitable for *AEE*.

THE USE OF FRAMEWORKS

Magana (2022) reiterates the importance of using frameworks in educational research and offers six categories, organizing them into three groupings based on usage:

- Theoretical and conceptual frameworks used in planning and executing the focus of a study
- Analytical and methodological frameworks used in planning and executing the methods of the study
- Instructional design and pedagogical frameworks used in the planning and delivering of instruction

Considering these categories and the distinctions regarding research and evaluation, we anticipate that studies published in *JEE* would draw on frameworks from the first two categories and works published in *AEE* would draw on the first and/or third categories.

THE ROLE OF THEORY

We also note the important role of theory in interpreting the findings from a study. According to Svincki (2010), an important purpose for using theory is to be able to situate findings into the current literature, i.e., what is already known. For *AEE*, the discussion will likely draw on theory to help explain and interpret what worked and what needs to be improved in the innovation for future applications. On the other hand, for *JEE*, this would likely include a discussion of how the findings advance the theory or theories used in the study.

The following questions might help readers decide where to submit their works based on their use of theory:

- Are theories used for designing the pedagogical innovation? If yes, *AEE* would be the better fit.
- Do the results advance theory or knowledge in the field? If yes, *JEE* would be the better fit.
- Is a theoretical or conceptual framework used in combination with a pedagogical or instructional framework? If yes, consider if the main focus of the work is on research or pedagogical innovation. If the former, *JEE* would be the better fit. If the latter, it would be more suitable for *AEE*.



- Does the discussion focus on how the theory was advanced? If yes, *JEE* would be the better fit. If the discussion is focused on how the theory informed the innovation or if the evaluation of the innovation was based on the theoretical or conceptual constructs of the framework, then *AEE* would be the better fit.

LOOKING AHEAD

AEE and *JEE* are two sides of the same coin, so to speak, with the “coin” being engineering education; one side is practice-oriented and the other research-oriented. Both *AEE* and *JEE* are important member benefits of ASEE, a professional organization that among other things is committed to fostering the creation and maintenance of high-impact journals in engineering education that provide members with publishing venues consistent with the faculty reward system. To that end, ASEE recently created an ad hoc Committee on Scholarly Publications led by Cindy Finelli and Nadia Kellam to create policies and practices that support this vision (Finelli and Kellam, personal communication, August 31, 2021). In addition to such work, it is important that those responsible for individual journals seek continual improvement. It is in that spirit that, as the editors of *AEE* and *JEE*, we offer our suggestions here to both clarify the purpose of each journal for authors and readers and work towards a better author experience by reducing ambiguities about the types of work published by each journal. We see this editorial as the start of a conversation about the roles of publications that will evolve within the engineering education community.

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